

IN THE CLAIMS:

1.-91. (Cancelled)

92. (Original) A thick-film paste composition suitable for screen printing onto a substrate, comprising:

- a) a binder phase;
- b) an organic vehicle phase; and
- c) a functional phase, said functional phase comprising copper metal particles,

wherein said copper metal particles are substantially spherical, have a weight average particle size of not greater than about 5 μm and an average crystallite size of at least about 40 nanometers.

93. (Original) A paste composition as recited in Claim 92, wherein said copper metal particles have a particle size distribution wherein at least about 90 weight percent of said metal particles are not larger than twice said average particle size.

94. (Original) A paste composition as recited in Claim 92, wherein said copper metal particles have a particle size distribution wherein at least about 95 weight percent of said metal particles are not larger than twice said average particle size.

95. (Original) A paste composition as recited in Claim 92, wherein said average particle size is not greater than about 3 μm .

96. (Original) A paste composition as recited in Claim 92, wherein said average particle size is from about 0.3 μm to about 1.5 μm .

97. (Original) A paste composition as recited in Claim 92, wherein said copper metal powder is a metal alloy particle comprising an effective amount of an alloying element to increase the oxidation resistance of the copper metal powder.

98. (Original) A paste composition as recited in Claim 92, wherein said binder phase comprises a glass frit.

99. (Original) A paste composition as recited in Claim 92, wherein said organic vehicle phase comprises a high molecular weight polymer dissolved in a solvent.

100. (Original) A paste composition as recited in Claim 92, wherein said organic vehicle phase comprises a polymer dissolved in a solvent, wherein said polymer is selected from the group consisting of ethyl cellulose, polyvinyl acetate, cellulose resin and acrylic resin and said solvent is selected from the group consisting of methanol, ethanol, terpineol, butyl carbitol, butyl carbitol acetate, aliphatic alcohols, esters and acetone.

101. (Original) A paste composition as recited in Claim 92, wherein said paste composition comprises from about 5 to about 95 weight percent of said functional phase.

102. (Original) A paste composition as recited in Claim 92, wherein said paste composition comprises from about 60 to about 85 weight percent of said copper metal particles.

103. (Original) A paste composition as recited in Claim 92, wherein said copper metal particles are composite particles comprising copper metal and a non-metallic phase.

104. (Original) A paste composition as recited in Claim 92, wherein said copper metal particles are composite particles comprising copper metal and a non-metallic second phase dispersed throughout said copper metal.

105. (Original) A paste composition as recited in Claim 92, wherein said copper metal particles are coated metal particles comprising a coating substantially encapsulating said particles.

106. (Original) A paste composition as recited in Claim 92, wherein said copper metal particles are coated metal particles comprising a metal oxide coating substantially encapsulating an outer surface thereof.

107. (Original) A thick-film paste composition suitable for screen printing onto a substrate, comprising:

- a) binder phase
- b) an organic vehicle phase; and
- c) a functional phase, said functional phase comprising composite copper metal particles having a weight average particle size not greater than about 5 μm , said composite particles including a metal phase comprising copper metal and at least a first non-metallic phase.

108. (Original) A paste composition as recited in Claim 107, wherein said composite metal particles have a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size.

109. (Original) A paste composition as recited in Claim 107, wherein said composite particles comprise at least about 50 weight percent copper metal.

110. (Original) A paste composition as recited in Claim 107, wherein said first non-metallic phase comprises a metal oxide.

111. (Original) A paste composition as recited in Claim 107, wherein said first non-metallic phase is dispersed throughout said copper metal phase.

112. (Original) A paste composition as recited in Claim 107, wherein said first non-metallic phase is a ceramic dielectric compound.

113. (Original) A paste composition as recited in Claim 107, wherein said first non-metallic phase is a ceramic dielectric compound selected from the group consisting of titanates, zirconates, silicates, aluminates, tantalates and niobates.

114. (Original) A paste composition as recited in Claim 107, wherein said first non-metallic phase is a ceramic dielectric compound comprising a titanate.

115. (Original) A paste composition as recited in Claim 107, wherein said composite particles comprise from about 0.2 to about 5 weight percent of said first non-metallic phase.

116. (Original) A paste composition as recited in Claim 107, wherein said composite copper metal particles comprise up to about 75 weight percent copper metal and wherein said first non-metallic phase is a metal oxide selected from the group consisting of alumina and silica.

117. (Original) A paste composition as recited in Claim 107, wherein said metal phase comprises crystallites having an average crystallite size of at least about 40 nanometers.

118. (Original) A paste composition as recited in Claim 107, wherein said weight average particle size is from about 0.3 μm to about 1.5 μm .

119.-221. (Cancelled)